

# PHYSICAL CHARACTERISATION OF THE SONG OF THE KOEL *EUDYNAMIS SCOLOPACEA*<sup>1</sup>

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AND

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(With four text-figures)

The koel *Eudynamis scolopacea* sings both in the morning and the evening. The morning song consists of 15 notes and the evening song 9 notes. As the note number increases, the frequency as well as the loudness of the song increases. Evening song usually contains high frequency notes. The frequencies range from 976 to 1818 Hz, which probably may be the reason for the mellowness of the song. When a recorded song was played to a singing koel, the latter stopped singing and sometimes quit its position. This suggests that the song reflects territoriality.

## INTRODUCTION

Bird song usually refers to the loud and persistent vocalisations delivered seasonally by males in possession of a breeding or courting territory (Brockway 1969). The song probably stimulates the female's breeding behaviour and also aids in spacing breeding males (Marler 1956). The same song may unleash an attack by others when it is broadcast within the bird's territory (Weeds and Falls 1959, Falls 1969). The ontogeny of bird song and its seasonal effect has been worked out for many species (Allard 1930, Thorpe 1956, Nottebohm 1970, Panov *et al.* 1978). For the Indian Koel, the breeding season lasts from March to July (Lamba 1963); its habitat and parasitic nature has been well documented (Ali 1977, Hume 1890, Lamba 1969). However, no attempt has been made to characterise its song, although it is considered by some to be the pleasantest among the songs of common Indian birds. In

the present study an attempt has been made to characterise the acoustic parameters of the daily song of the koel.

## METHODS

Two Sennheiser MKH 805 directional microphones were placed 15' (about 4.6 m) apart, on a tree top, which was identified earlier as being visited by the koel. The microphones were connected to a 5310 National Panasonic tape recorder, placed on the ground and 100' away (30.5 m) from the tree. With such a set-up the song of the koel both in the morning (6-8 a.m.) and in the evening (4-5.30 p.m.) were recorded during the months April-June, 1979. Pre-recorded tapes were analysed for quality of notes of the songs using a Fourier Analyzer System (Hewlett-Packard). Note frequencies and song timings were obtained from the converter.

## RESULTS

The morning song consists of 15 notes with a total duration of 40.96 s, and each note in

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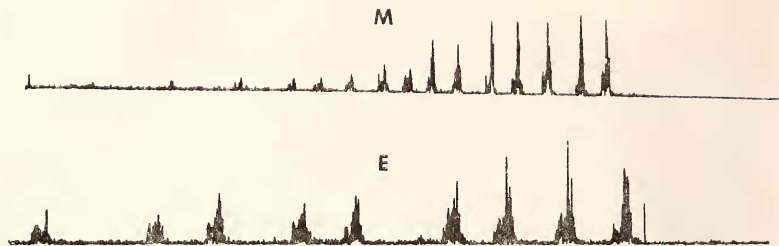


Fig. 1. Spectrograms of morning and evening songs of the koel. Horizontal axis denotes time in s and vertical axis represents loudness in millivolts.

Scale: M- x axis 1 cm 2.48 s; y axis 1 cm 2.1 mV

E- x axis 1 cm 1.2 s; y axis 1 cm 5 mV

the song is of 0.5 s duration. The evening song consists of 9 notes with a total duration of 20.48 s and a note duration of 0.6 s. Sometimes there were 14 notes in the morning song and 8 in the evening song. The internote period in both songs is not constant (Fig. 1). The song starts with low "kuoo", the loudness of which rises in scale gradually in both morning and evening songs (Fig. 1). The frequency of the sound at which the notes are delivered also varies as the notes proceed. In the morning song, as the note number increases the frequency gradually increases non-linearly. In the evening song there is linearity in the increase of frequencies as the notes are delivered (Fig. 2). The evening song invariably consists of higher frequencies (Fig. 2). The morning song starts with a frequency of 976-1218 Hz and ends with 1381-1818 Hz in the fifteenth note (Fig. 3). The evening song starts with 1200 Hz-1393 Hz and ends with 1243-1787 Hz. (Fig. 4). When the song reaches the final frequency the koel stops singing for some time and again resumes the song in the same frequencies. When a recorded song was played to a singing koel, it often stopped singing and

sometimes quit its position.

#### DISCUSSION

The koel breeds during March-June in southern parts of India (Lamba 1969). The song of the koel can be heard in the same months and therefore, the coincidence of the song with season could be related to the breeding activity and the reproductive behaviour of the bird. It is also known that only the male koel sings till it mates (Lamba 1969). There is evidence that testosterone stimulates the mating behaviour of birds (Andrews 1964, Hamilton 1938, Hutchinson 1970). However, no correlations were made that the same hormone induced singing in birds. We tried in vain to check whether there were any behavioural responses in other koels of the surroundings when the tapes were played back, but the song has impact on the singing of a conspecific. When the recorded tape is played before a singing bird, the latter stops singing and flies away. This suggested that the song is purely territorial. Similar such territorial songs were noted in male chaffinches (Thorpe 1956).

SONG OF THE KOEL (*EUDYNAMIS SCOLOPACEA*)

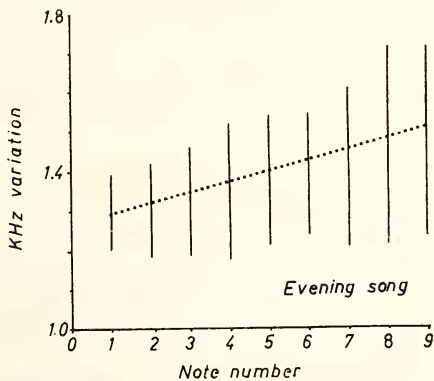
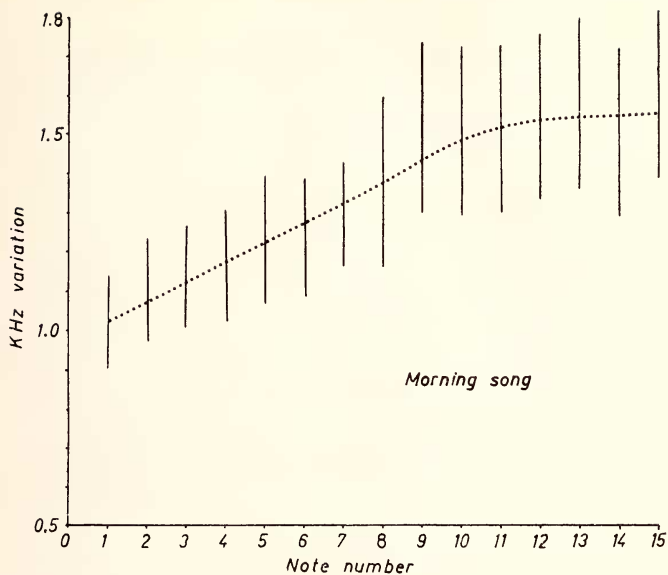


Fig. 2. Changes in frequencies in relation to the note number in morning and evening songs of the Koel.

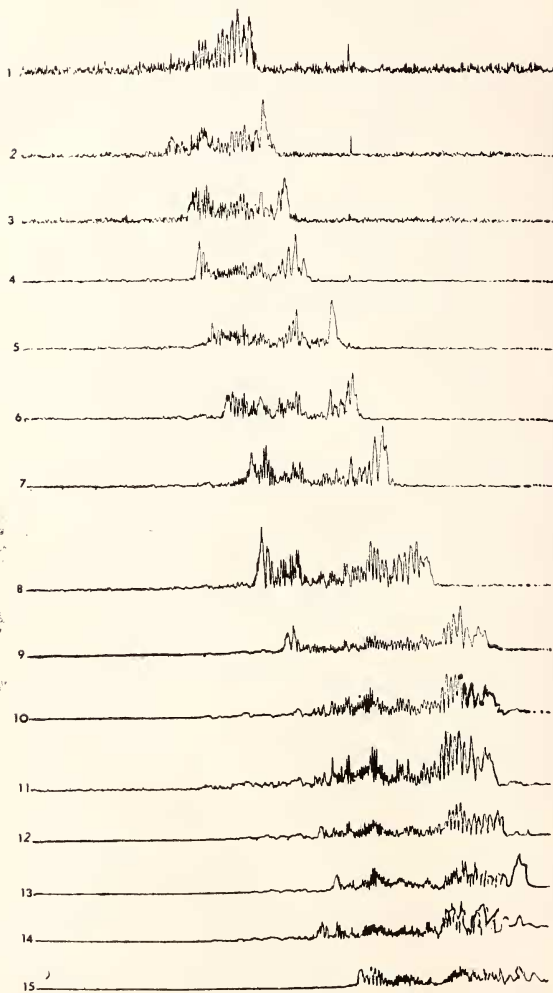


Fig. 3. Spectrograms of the notes of morning song of the Koel. Horizontal axis denotes the frequency in Hz and vertical axis represents loudness.  
Scale: x axis 1 cm 62.5 Hz with 625 Hz as starting y axis 1 cm  $2 \times 10^{-2}V$

SONG OF THE KOEL (*EUDYNAMIS SCOLOPACEA*)

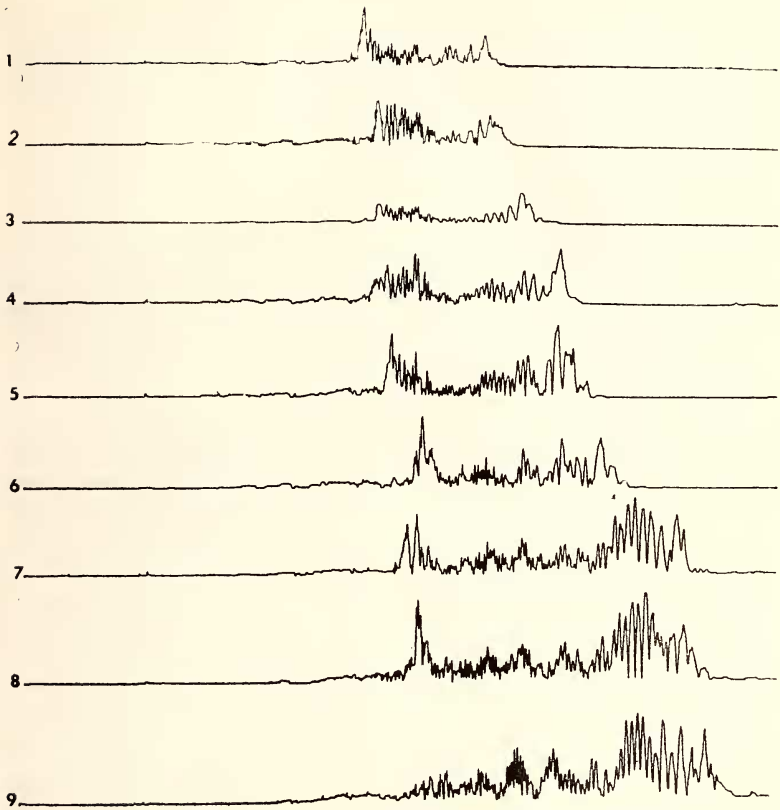


Fig. 4. Spectrograms of the notes of the evening song of the Koel Horizontal axis denotes frequency in kHz and vertical axis represents loudness.  
Scale: x axis 1 cm 625 Hz with 625 Hz as starting point frequency  
y axis 1 cm  $2 \times 10^{-2}$ V

Brockway (1969) suggested that the strength of the song and its persistence may be a measure of metabolism of the bird and climatic conditions at any particular place. This may be true for the difference in the number of notes observed in the morning and evening songs. Changes due to climatic conditions may be over ruled as there were not much variations in air temperatures between morning and evening in the present context. Correlations between climate and song (Allard 1930) was possible in the case of the dove which inhabits temperate lands. Probably the metabolism of the koel determines the shortness of the song in the evenings.

It is interesting to note that after the 9th

note in morning song, the frequencies of the notes remained constant. Decrease in the note number in the evening song can be attributed to the physiological status of the bird. Exhaustion after a day's activity may decrease the note number.

#### ACKNOWLEDGEMENTS

We are thankful to Dr. D. Anand and Mr. H. S. Srinivas Chakravorthi, Department of Electronic Communications, Indian Institute of Science for their help in spectrographic analysis of the song; and Dr. R. Narayana for encouragement.

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